

Consider only routes with no AS loops and a valid next hop.

Use Longest Prefix Match.

Where multiple routes are available to identical network and prefix:

- Prefer highest weight (local to router).
- Prefer highest local preference (global within AS).
- Prefer route originated by the local router ('network' command or redistribution).
- Prefer shortest AS path.
- Prefer lowest origin code: IGP ('network') < EGP (legacy) < incomplete (redistributed).
- Prefer lowest MED (exchanged between autonomous systems).
- Prefer EBGP path over IBGP path.
- Prefer the path through the closest IGP neighbor.
- Prefer oldest route for EBGP paths.
- Prefer the path with the lowest neighbor BGP router ID.
- Prefer the path with the lowest neighbor IP address.

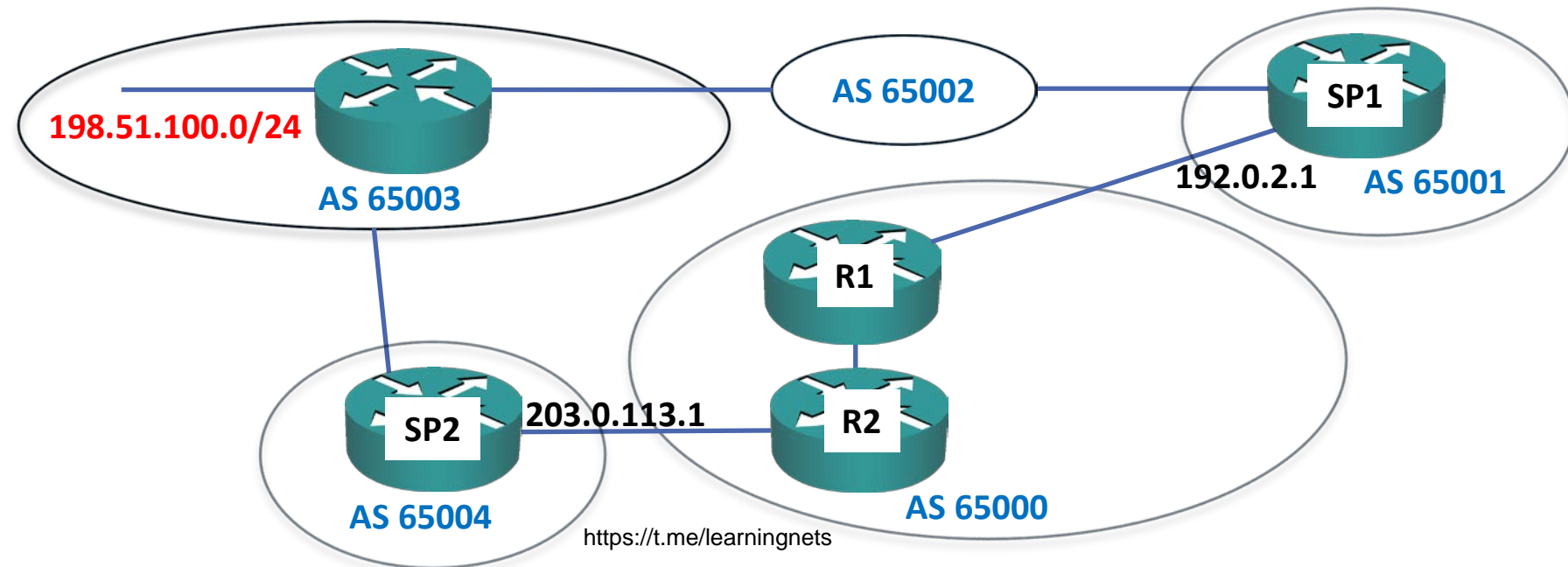
Local Preference



- Both Weight and Local Preference can be used to influence outbound path selection from an AS.
- Local Preference can be used to select a consistent outbound path to destination networks for all BGP routers in an AS.
- The Local Preference is sent to iBGP neighbors only (sent within the AS only) and is also used by the router it is configured on.
- Default value is 100.
- Paths with **higher** value are more preferred.

Local Preference Example

- R1 and R2's preferred path to the 198.51.100.0/24 network is via AS 65004 because it has a shorter AS Path
- Local Preference can be configured on R1 so that both routers prefer the route via AS 65001 instead

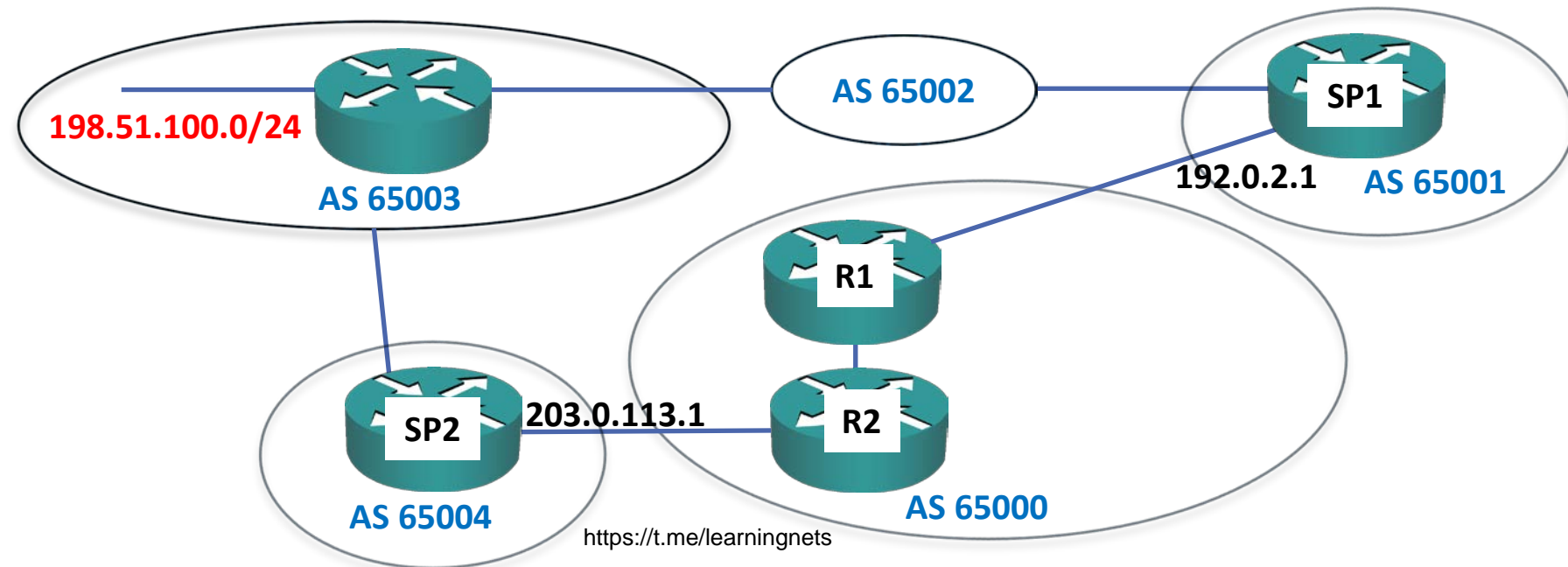


Verification – show ip bgp (Before Policy)

```
R1#show ip bgp
```

	Network	Next Hop	Metric	LocPrf	Weight	Path
*>i	198.51.100.0	203.0.113.1		100	0	65004 65003 i
*		192.0.2.1			0	65001 65002 65003 i

- Local Preference is only set in updates sent to iBGP neighbors, so only received iBGP routes show a Local Preference value in the 'show ip bgp' output
- Locally injected routes and received eBGP routes show a blank value, and use a default local value of 100



<https://t.me/learningnets>

Verification – show ip bgp (Before Policy)

```
R1#show ip bgp 198.51.100.0
```

```
BGP routing table entry for 198.51.100.0/24, version 14
```

```
Paths: (2 available, best #1, table default)
```

```
  Advertised to update-groups:
```

```
    1
```

```
  Refresh Epoch 1
```

```
  65004 65003
```

```
    203.0.113.1 from 192.168.0.2 (192.168.0.2) Next Hop from BGP Peer Address (BGP Router ID)
```

```
      Origin IGP, metric 0, localpref 100, valid, internal, best
```

```
      rx pathid: 0, tx pathid: 0x0
```

```
  Refresh Epoch 2
```

```
  65001 65002 65003
```

```
    192.0.2.1 from 192.0.2.1 (172.16.0.1)
```

```
      Origin IGP, localpref 100, valid, external
```

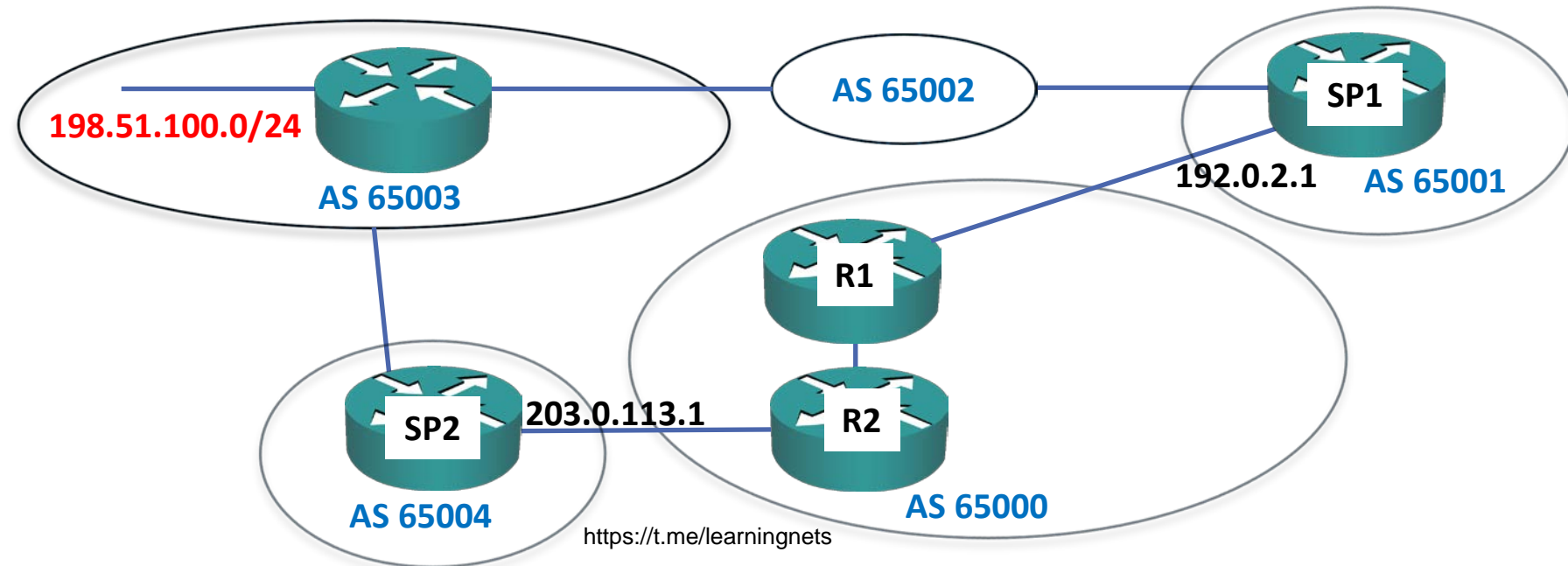
```
      rx pathid: 0, tx pathid: 0
```

Verification – show ip bgp (Before Policy)

```
R2#show ip bgp
```

	Network	Next Hop	Metric	LocPrf	Weight	Path
*>	198.51.100.0	203.0.113.1			0	65004 65003 i

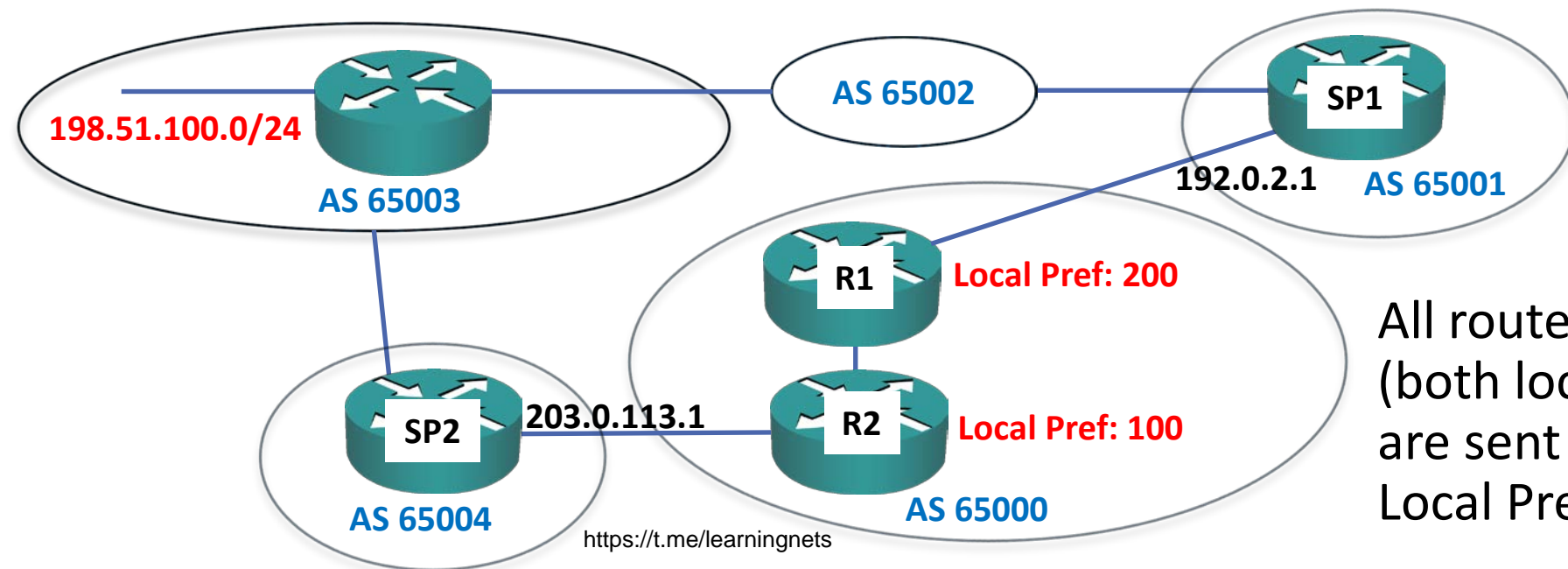
- R1's preferred path to the 192.51.100.0/24 network is via R2
- Loop prevention stops the path from being advertised by R1 back to R2



Local Preference – Primary/Backup

```
R1(config)#router bgp 65000
```

```
R1(config-router)#bgp default local-preference 200
```

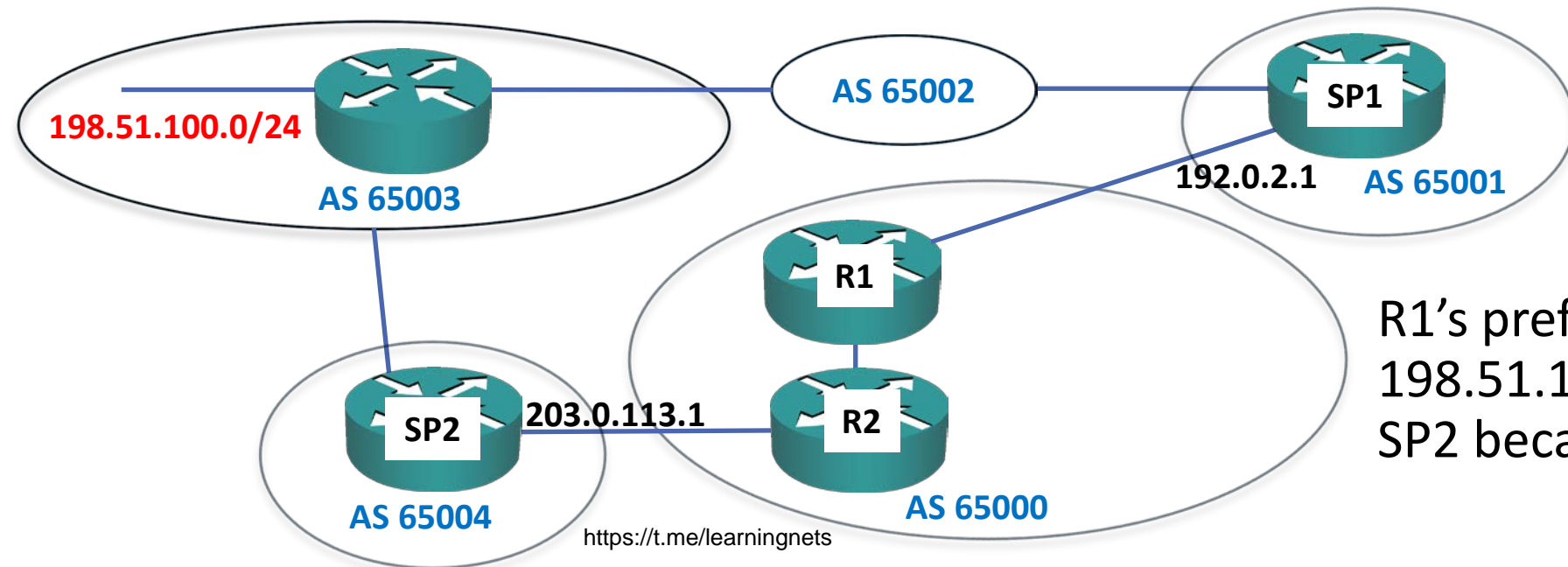


All routes in the BGP table on R1 (both locally injected and received) are sent to iBGP neighbors with a Local Preference of 200 by default

Verification – show ip bgp (Before Policy)

```
R1#show ip bgp
```

	Network	Next Hop	Metric	LocPrf	Weight	Path
*>i	198.51.100.0	203.0.113.1		100	0	65004 65003 i
*		192.0.2.1			0	65001 65002 65003 i



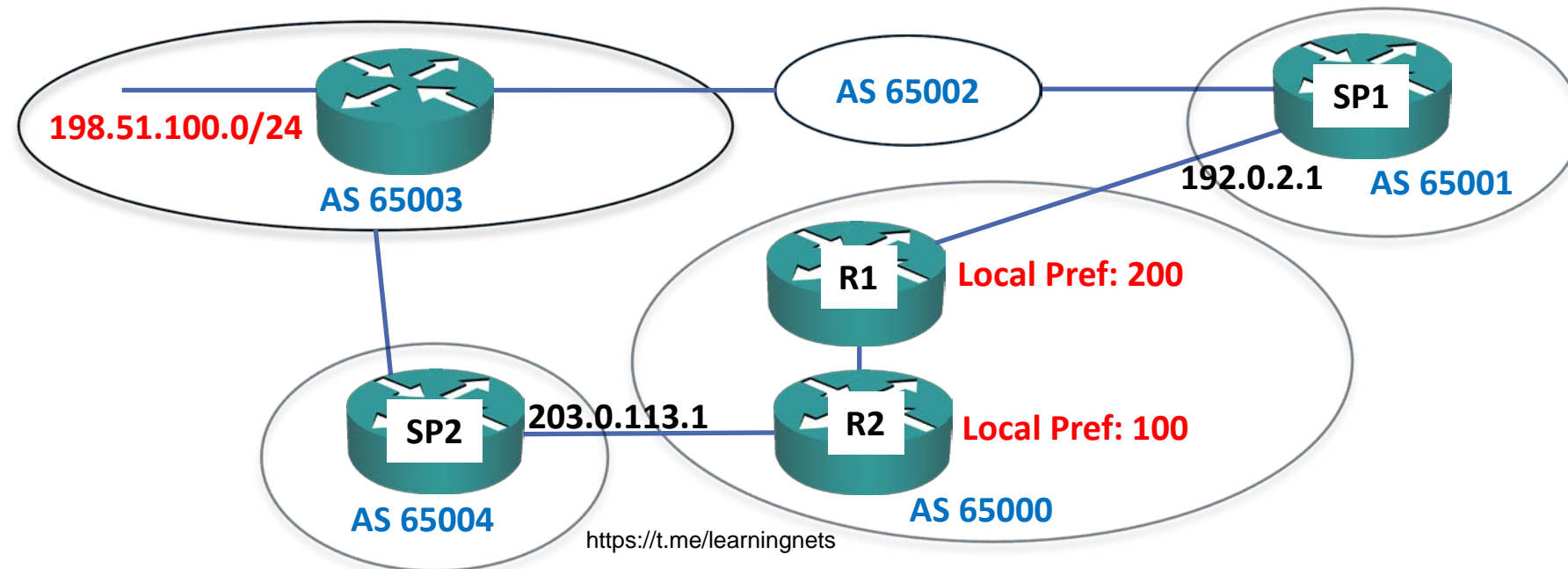
R1's preferred path to the 198.51.100.0/24 network was via SP2 because it has a shorter AS Path

Verification – show ip bgp (After Policy)

```
R1#show ip bgp
```

```
*> Network          Next Hop           Metric LocPrf Weight Path
      198.51.100.0   192.0.2.1         0 65001 65002 65003 i
```

- R2's preferred path to the 198.51.100.0/24 network is now via R1
- Loop prevention stops the path from being advertised by R2 back to R1



Verification – show ip bgp (After Policy)

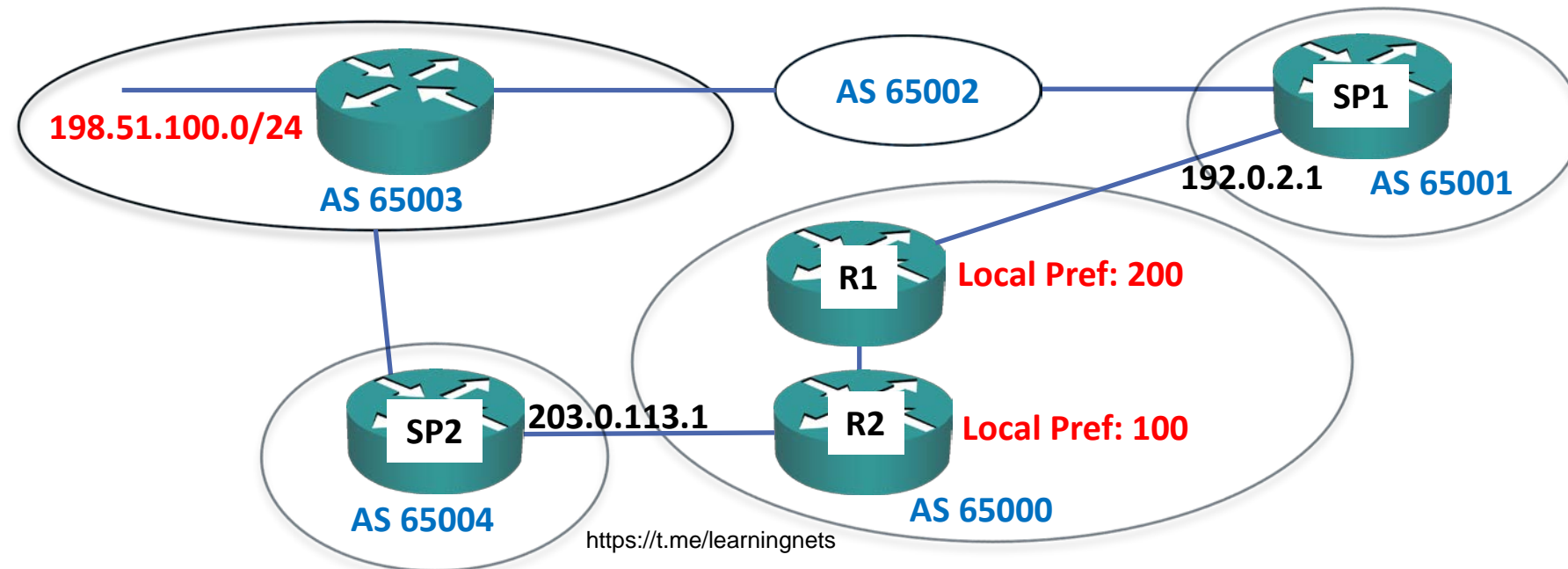
```
R1#sh ip bgp 198.51.100.0
```

```
BGP routing table entry for 198.51.100.0/24, version 7
```

```
! truncated
```

```
65001 65002 65003
```

```
Origin IGP, localpref 200, valid, external, best  
rx pathid: 0, tx pathid: 0x0
```



Verification – show ip route



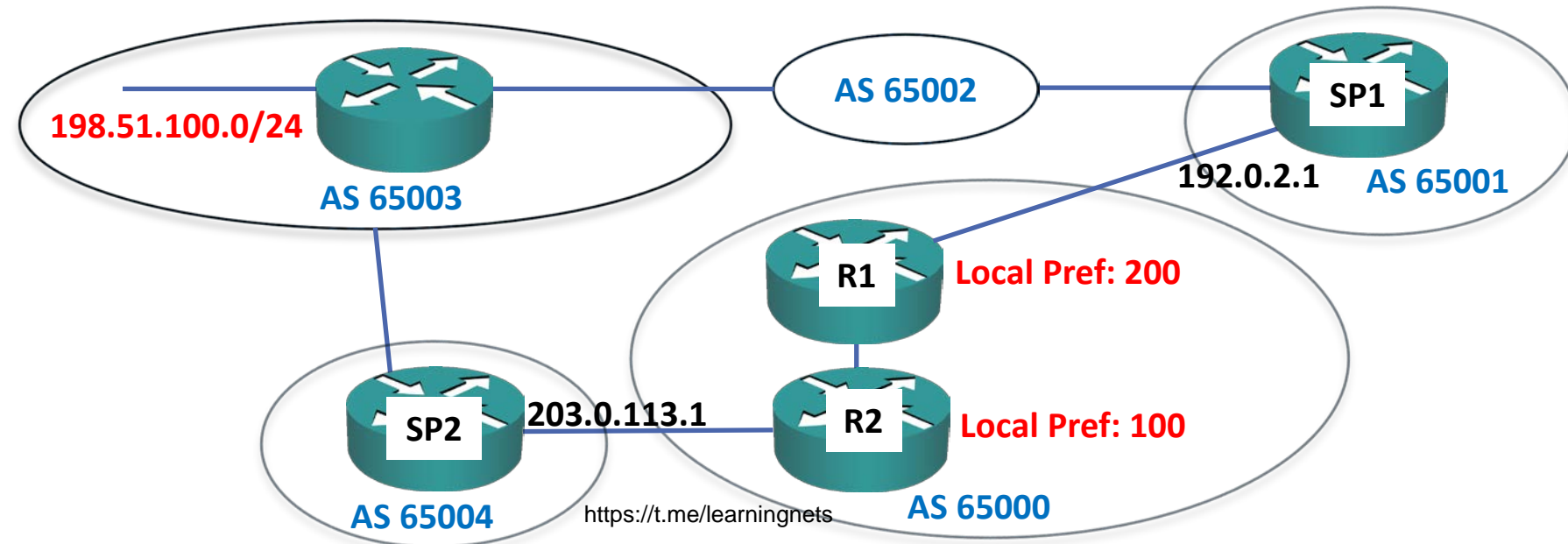
```
R1#show ip route bgp
```

```
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP  
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
E1 - OSPF external type 1, E2 - OSPF external type 2  
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2  
ia - IS-IS inter area, * - candidate default, U - per-user static route  
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP  
a - application route  
+ - replicated route, % - next hop override, p - overrides from PfR
```



```
Gateway of last resort is not set
```

```
B 198.51.100.0 [20/0] via 192.0.2.1, 00:25:07
```

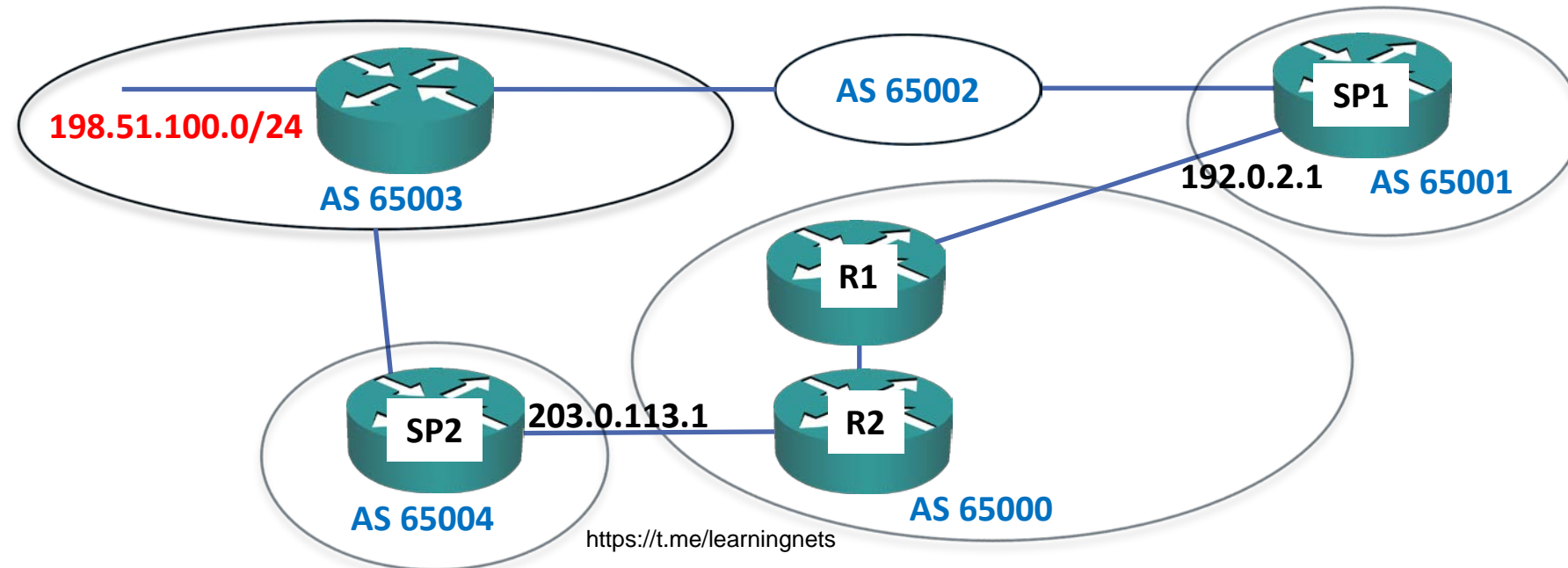


Verification – show ip bgp (Before Policy)

```
R2#show ip bgp
```

	Network	Next Hop	Metric	LocPrf	Weight	Path
*>	198.51.100.0	203.0.113.1			0	65004 65003 i

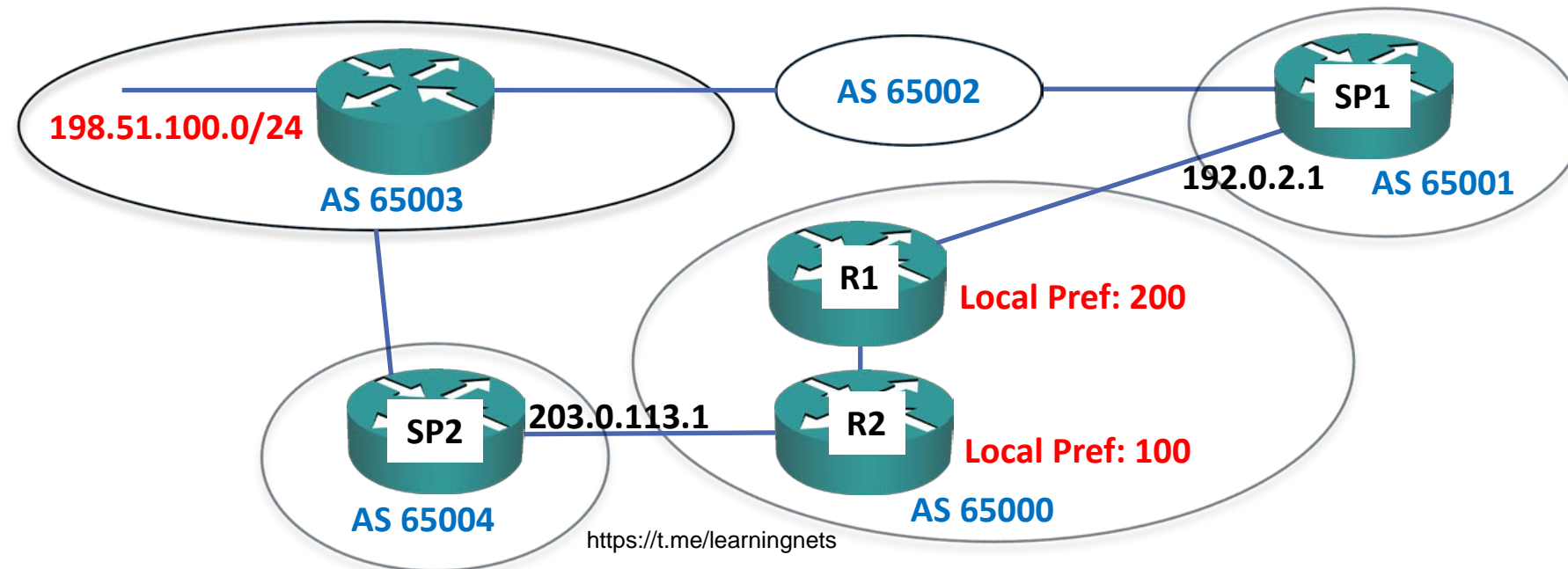
- R1's preferred path to the 198.51.100.0/24 network is via R2
- Loop prevention stops the path from being advertised by R1 back to R2



Verification – show ip bgp (After Policy)

```
R2#show ip bgp
```

	Network	Next Hop	Metric	LocPrf	Weight	Path
*	198.51.100.0	203.0.113.1			0	65004 65003 i
*>i		192.0.2.1		200	0	65001 65002 65003 i



Verification – show ip route



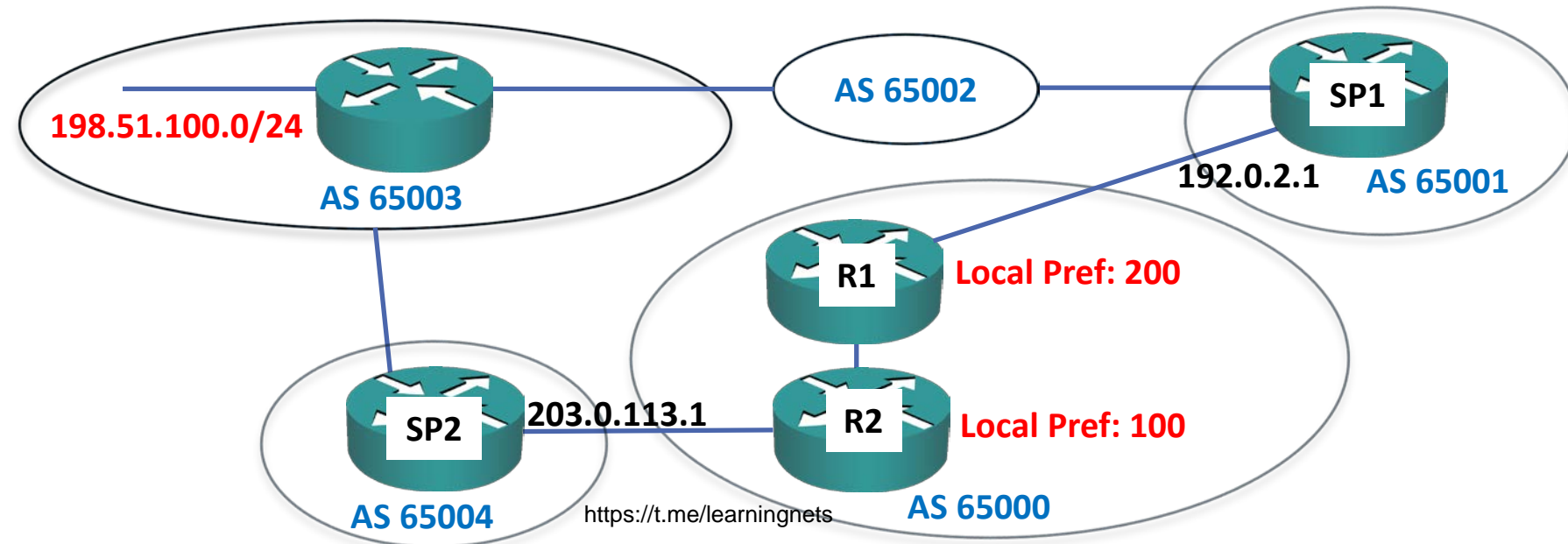
```
R2#show ip route bgp
```

```
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
a - application route
+ - replicated route, % - next hop override, p - overrides from PfR
```



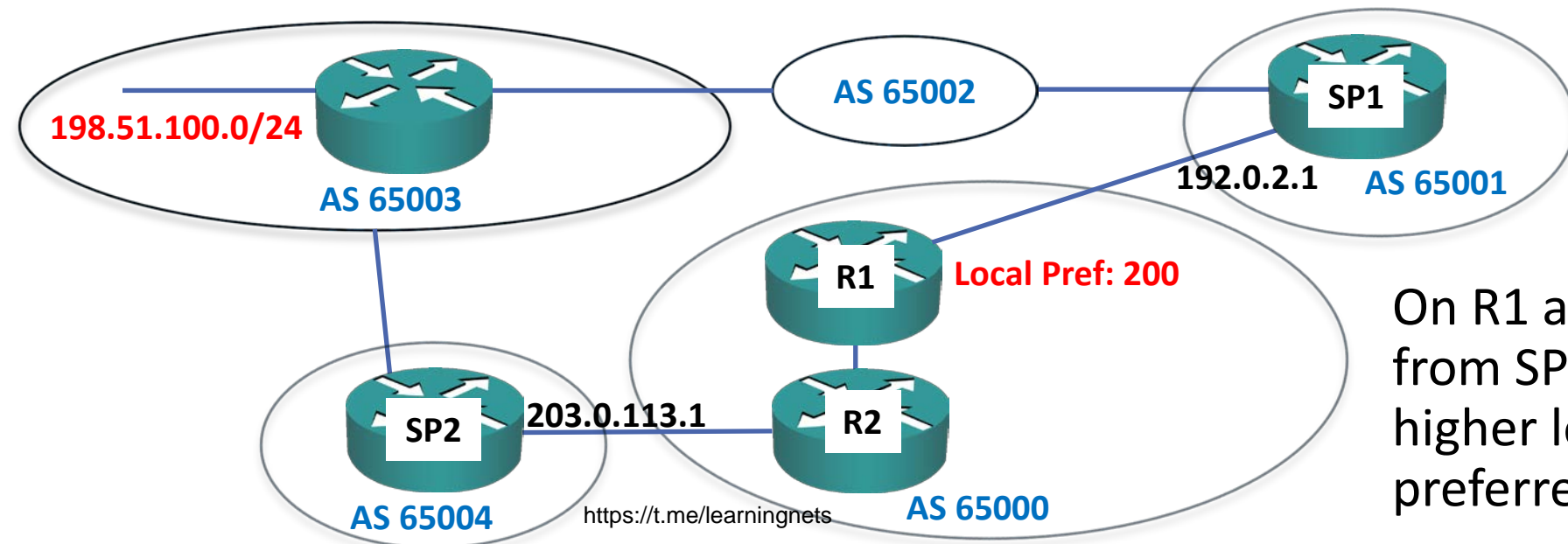
```
Gateway of last resort is not set
```

```
B 198.51.100.0 [200/0] via 192.0.2.1, 00:25:07
```



Local Preference Example 2A - ACL

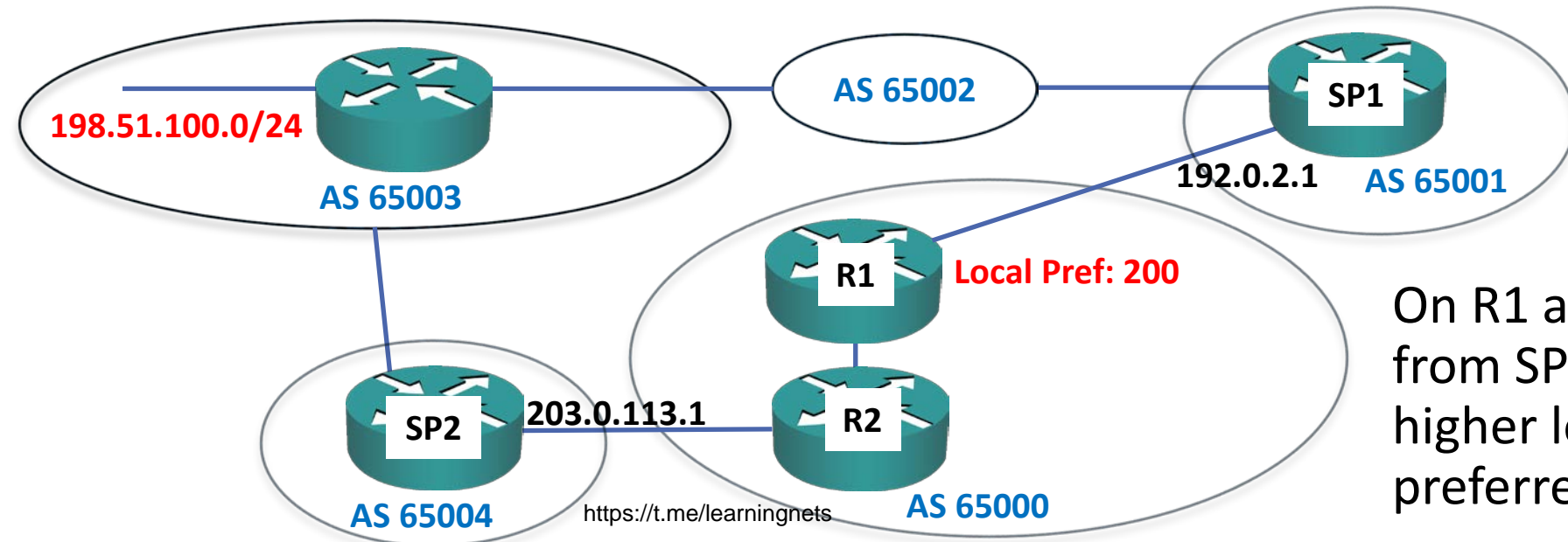
```
R1(config)#access-list 12 permit 198.51.100.0 0.0.0.255
R1(config)#route-map EXAMPLE2A permit 10
R1(config-route-map)#match ip address 12
R1(config-route-map)#set local-preference 200
R1(config)#route-map EXAMPLE2A permit 20
R1(config)#router bgp 65000
R1(config-router)#neighbor 192.0.2.1 route-map EXAMPLE2A in
```



On R1 and R2, the route received from SP1 for 198.51.100.0/24 has a higher local preference and is preferred to the route from SP2

Local Preference Example 2B – Prefix List

```
R1(config)#ip prefix-list TO_198.51.100.0/24 permit 198.51.100.0/24
R1(config)#route-map EXAMPLE2B permit 10
R1(config-route-map)#match ip address prefix-list TO_198.51.100.0/24
R1(config-route-map)#set local-preference 200
R1(config)#route-map EXAMPLE2B permit 20
R1(config)#router bgp 65000
R1(config-router)#neighbor 192.0.2.1 route-map EXAMPLE2B in
```



On R1 and R2, the route received from SP1 for 198.51.100.0/24 has a higher local preference and is preferred to the route from SP2

Local Preference vs Weight



- Weight and Local Preference can both be used to influence outbound path selection
- Weight is Cisco Proprietary and can only be used to influence path selection on the single local router it is configured on
- Local Preference is a BGP standard and a single configuration can be used to influence path selection on all the BGP routers in an AS (one router or more)
- Local Preference is typically the preferred method
- Use Local Preference to ensure consistent AS wide path selection
- You can use Weight to override path selection on an individual router